SHRP2 C20: Freight Demand Modeling and Data Improvement Strategic Plan

Outcome and Project Status – (Brief Overview)
Implementation Assistance Program (IAP) Purpose:

To foster fresh ideas and new approaches to freight demand modeling and data collection that ultimately enhance decision-making.
**C20 IAP Kickoff**

<table>
<thead>
<tr>
<th>Third Round - January 2014</th>
<th>Proof of Concept Pilot</th>
<th>Lead Adopter Incentive</th>
<th>User Incentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>C20 – Freight Demand Modeling and Data Improvement</td>
<td>9-11</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Funding (up to **$350K** per proof of concept pilot applicant) is available, for **4** pilots, to be applied to the implementation of - **The Behavior-Based Freight Modeling**, and,

Funding (up to **$150K** per proof of concept pilot applicant) is available, for **5-7** pilots, to be applied to the implementation of - **The Innovations in Local Freight Data**.
# C20 - Strategic Plan

The sample research initiatives outlined as part of SHRP2 C-20 demonstrate how the strategic objectives could be advanced. Each also applies to one or more of the three research dimensions.

## Sample Research Initiatives

<table>
<thead>
<tr>
<th>Research Dimensions</th>
<th>Strategic Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Directly Addresses Objective</td>
</tr>
<tr>
<td>Models</td>
<td>1. Improve and expand knowledge base</td>
</tr>
<tr>
<td>Data</td>
<td>2. Develop modeling methods to reflect actual supply chain management practices</td>
</tr>
<tr>
<td></td>
<td>3. Develop modeling methods based on sound economic principles</td>
</tr>
<tr>
<td></td>
<td>4. Develop standard freight data to smaller geographic scales</td>
</tr>
<tr>
<td></td>
<td>5. Standardize tools for public sector for planning and programming</td>
</tr>
<tr>
<td></td>
<td>6. Improve availability and predictability of data between public and private sectors</td>
</tr>
<tr>
<td></td>
<td>7. Develop new and enhanced visualization techniques</td>
</tr>
</tbody>
</table>

### A: Determine the freight and logistics knowledge and skill requirements for transportation decision-makers, and professional and technical personnel. Develop the associated learning systems to address knowledge and skill deficits.

### B: Establish techniques and standard practices to validate freight forecasts.

### C: Establish modeling approaches for “behavior-based” freight movement.

### D: Develop methods that predict mode shift and highway capacity implications of various “what-if” scenarios.

### E: Develop a range of freight forecasting methods/tools that address decision-making needs and that can be applied at all levels (i.e., national, regional, state, MPO, municipal).

### F: Develop robust tools for freight cost-benefit analysis that go beyond financial to the full range of benefits, costs, and externalities.

### G: Establish analytical approaches that describe how elements of the freight transportation system operate, perform, and impact the larger overall transportation system.

### H: Determine how economic, demographic, and other factors/conditions drive freight patterns and characteristics. Document economic and demographic changes related to freight choices.

### I: Develop freight data resources for application at sub-regional levels.

### J: Establish, pool, and standardize a portfolio of core freight data sources/sets that support planning, programming, and project prioritization.

### K: Develop procedures for applying freight forecasting to the design of transportation infrastructure such as pavement and bridges.

### L: Advance research to effectively integrate logistics practices (private sector) with transportation policy, planning, and programming (public sector).

### M: Develop visualization tools for freight planning and modeling through a two-pronged approach of discovery and addressing known decision-making needs.
## Results of the First Survey

<table>
<thead>
<tr>
<th>Rank</th>
<th>Initiative</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>E</strong>: Develop a range of freight forecasting methods and tools that address decision-making needs and that can be applied at all levels (national, regional, state, metropolitan planning organization, municipal).</td>
</tr>
<tr>
<td>2</td>
<td><strong>I</strong>: Develop freight data resources for application at subregional levels.</td>
</tr>
<tr>
<td>3</td>
<td><strong>C</strong>: Establish modeling approaches for behavior-based freight movement.</td>
</tr>
<tr>
<td>4</td>
<td><strong>J</strong>: Establish, pool, and standardize a portfolio of core freight data sources and data sets that supports planning, programming, and project prioritization.</td>
</tr>
<tr>
<td>5</td>
<td><strong>B</strong>: Establish techniques and standard practices to review and evaluate freight forecasts.</td>
</tr>
<tr>
<td>6</td>
<td><strong>H</strong>: Determine how economic, demographic, and other factors and conditions drive freight patterns and characteristics. Document economic and demographic changes related to freight choices.</td>
</tr>
</tbody>
</table>
## Results of the First Survey

<table>
<thead>
<tr>
<th>Rank</th>
<th>Initiative</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td><strong>D:</strong> Develop methods that predict mode shift and highway capacity implications of various what-if scenarios.</td>
</tr>
<tr>
<td>8</td>
<td><strong>L:</strong> Advance research to effectively integrate logistics practices (private sector) with transportation policy, planning, and programming (public sector).</td>
</tr>
<tr>
<td>9</td>
<td><strong>M:</strong> Develop visualization tools for freight planning and modeling through a two-pronged approach of discovery and addressing known decision-making needs.</td>
</tr>
<tr>
<td>10</td>
<td><strong>G:</strong> Establish analytic approaches that describe how elements of the freight transportation system operate and perform and how they affect the larger overall transportation system.</td>
</tr>
<tr>
<td>11</td>
<td><strong>F:</strong> Develop robust tools for freight cost–benefit analysis that go beyond financial considerations to the full range of benefits, costs, and externalities.</td>
</tr>
<tr>
<td>12</td>
<td><strong>A:</strong> Determine the freight and logistics knowledge and skill requirements for transportation decision makers and professional and technical personnel. Develop the associated learning systems to address knowledge and skill deficits.</td>
</tr>
<tr>
<td>13</td>
<td><strong>K:</strong> Develop procedures for applying freight forecasting to the design of transportation infrastructure, particularly pavement and bridges.</td>
</tr>
</tbody>
</table>
C20: Freight Demand Modeling and Data Improvement

Implementation Plan:

• Implementation Assistance Program (Short-term; 2-3 yrs)
• National Initiatives (Medium-Long term; > 5 yrs)
C20: Implementation Assistance Program (IAP) - Projects

Completed
Year 2015
Year 2016
Year 2017
Recipient: Portland Metro  
State: Oregon  
Pilot Type: Behavior-based Model

- Transfer FHWA truck tour model framework to a metropolitan region
- Update its specification and re-estimate parameters using the results of separately funded local surveys
- Add model components to simulate movement of heavier classes of non-goods commercial vehicles
- Simulate movement of individual shipments and vehicles
Recipient: Maricopa Association of Governments
State: Arizona
Pilot Type: Behavior-based Model

- Using Arizona’s Sun Corridor, develop freight models applicable to the unique needs of expanding metropolitan regions known as mega-regions.
- Develop an agent-based model to implement a micro-simulation approach to the freight system modeling in MAG region.
- Develop a multimodal freight model for major commodities relevant to the mega-region using commodity-based analysis of freight flows.
IAP Projects

Recipient: Wisconsin DOT
State: Wisconsin
Pilot Type: Behavior-based Model

- Develop a new framework for multimodal State freight transportation modeling through the development of national, open-tour, supply chain and metropolitan, and closed-tour delivery models
- Provide a context for Statewide freight transportation planning by linking freight industry concepts to WisDOT goals and planning procedures
- Represent characteristics of firms, shipments, supply chains and distribution channels, and describe trip touring during the delivery of goods
IAP Projects

Recipient: Maryland State Highway Administration and Baltimore Metropolitan Council
State: Maryland
Pilot Type: Behavior-based Model

- Develop a regional, tour-based commercial vehicle model integrated with the long distance truck sub-models
- Conduct a model design workshop to capture State/regional policies
- Identify technical needs for policy analysis and project alternatives evaluation through freight-related, performance-based information
Recipient: Capital District Transportation Committee
State: New York
Pilot Type: Local Data

- Obtain timely freight data at the zip code or transportation analysis zone (TAZ) level that accurately characterizes freight movement
- Develop a process to effectively collect, integrate, and maintain freight-related data from multiple sources
Recipient: Delaware Valley Regional Planning Commission
State: Pennsylvania
Pilot Type: Local Data

- Supplement ongoing freight data collection program
- Increase amount of data presented on freight data clearinghouse, PhillyFreightFinder, and enhance the data clearinghouse’s replicability
- Identify and prioritize data needs of public and private sectors
IAP Projects

Recipient: City of Winston-Salem
State: North Carolina
Pilot Type: Local Data

- Produce a new data source and model recommendations to support the development of a freight component to the region’s travel demand model

- Establish analytic approaches describing how elements of the freight transportation system operate and perform, and how they affect the larger transportation system
Recipient: Florida DOT  
State: Florida  
Pilot Type: Local Data  

- Use emerging technologies for automated vehicle recognition and classification counts for better understanding of goods movement  
- Support regional planning for transportation needs by clarifying the complex supply chain of petroleum commodities at Port Everglades moving to the 12 counties of South Florida
Recipient: Mid-America Regional Council
State: Missouri
Pilot Type: Local Data

- Combine existing data with new source of commercial freight waybill data
- Measure direct economic impact of infrastructure investment on the freight transportation system
- Implement analysis techniques that combine near- and long-term trend analysis to account for changing market conditions
Recipient: South Dakota DOT
State: South Dakota
Pilot Type: Local Data

- Gain insight into the State’s highly dynamic agriculture industry and related transportation system demands
- Augment historical trends data with unconventional data sources
- Support freight forecasting at local and State levels, with applicability at regional and national levels
IAP Projects

**Recipient:** Washington State DOT

**State:** Washington

**Pilot Type:** Local data

- Understand interplay between public policy, market forces, and supply chain behavior
- Focus on food distribution supply chains in central Puget Sound and the cross-State wheat supply chains
- Support truck trip modeling by collecting truck count data at food distribution facilities under variety of land use scenarios
- Use interviews and questionnaires to collect information on characteristics of business and likely behavioral responses
C20 National Initiatives

• AASHTO
  – Freight Modeling and Data Expert Task Group
  – Regional Freight Data and Modeling/Tool Standardization Workshops

• Promote Advanced Research activities

• FMIP Portal – ‘Freight Information Place’

• Collaboration, Knowledge Sharing and Outreach
  – Practitioner Handbook
  – Project Case Studies
  – Briefings
  – Peer Exchanges
  – Cross-agency trainings
  – Conferences and presentations
  – Executive training
  – Champion outreach

• Additional Strategic Plan Objectives Development
C20 Implementation Roadmap

2014          2015          2016          2017           2018

- Outreach Materials
- IAP Projects and Case Studies
- Document Transferable Approaches
- Expert Task Group
- Regional Workshops
- Address Gaps
- Promote and Advance Research activities
- Organize and Facilitate Peer Exchanges
- Identify Champions & Engage Agencies
- Update National Policies & Resources
- Mainstreaming Data and Modeling
# C20: Points of Contact

## FHWA

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone Number</th>
<th>Email Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stephen Clinger</td>
<td>202-366-2168</td>
<td><a href="mailto:Stephen.Clinger@dot.gov">Stephen.Clinger@dot.gov</a></td>
</tr>
<tr>
<td>Vidya Mysore</td>
<td>404-562-3929</td>
<td><a href="mailto:vidya.mysore@dot.gov">vidya.mysore@dot.gov</a></td>
</tr>
<tr>
<td>Birat Pandey</td>
<td>410-962-2253</td>
<td><a href="mailto:birat.pandey@dot.gov">birat.pandey@dot.gov</a></td>
</tr>
</tbody>
</table>

## AASHTO

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone Number</th>
<th>Email Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matt Hardy</td>
<td>202-624-3625</td>
<td><a href="mailto:mhardy@aashto.org">mhardy@aashto.org</a></td>
</tr>
<tr>
<td>Keith Platte</td>
<td>202-624-3697</td>
<td><a href="mailto:keith.platte@aashto.org">keith.platte@aashto.org</a></td>
</tr>
</tbody>
</table>